

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

David Martin
Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey, Division Director
Oil Conservation Division



New Mexico Oil Conservation Division approval and conditions
listed below are made in accordance with OCD Rule 19.15.7.11
and are in addition to the actions approved by BLM on the
following 3160-3 APD form.

Operator Signature Date: 9/25/13

Well information;

Operator Encana, Well Name and Number Lybrook P28-2306 2H

API# 30-043-21177, Section 4, Township 23 NS, Range 6 E/W

Conditions of Approval:

(See the below checked and handwritten conditions)

- ☒ Notify Aztec OCD 24hrs prior to casing & cement.
- ☒ Hold C-104 for directional survey & "As Drilled" Plat
- ☐ Hold C-104 for NSL, NSP, DHC
- ☐ Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned
- ☐ Regarding the use of a pit, closed loop system or below grade tank, the operator must comply with the following as applicable:
 - A pit requires a complete C-144 be submitted and approved prior to the construction or use of the pit, pursuant to 19.15.17.8.A
 - A closed loop system requires notification prior to use, pursuant to 19.15.17.9.A
 - A below grade tank requires a registration be filed prior to the construction or use of the below grade tank, pursuant to 19.15.17.8.C
- ☐ Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string
- ☐ Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils

Charles Kern
NMOCD Approved by Signature

1-10-14 ca
Date

CONFIDENTIAL

FORM APPROVED
OMB No. 1004-0137
Expires July 31, 2010

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

RECEIVED

SEP 26 2013

1a. Type of work: ☒ DRILL ☐ REENTER		5. Lease Serial No. NMNM 112953 (NMNM 109386)
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other		6. If Indian, Allottee or Tribe Name N/A
2. Name of Operator Encana Oil & Gas (USA) Inc.		7. If Unit or CA Agreement, Name and No. PENDING
3a. Address 370 17th Street, Suite 1700 Denver, CO 80202		8. Lease Name and Well No. Lybrook P28-2306 02H
3b. Phone No. (include area code) 720-876-3989		9. API Well No. 30-043-21177
4. Location of Well (Report location clearly and in accordance with any State requirements.) At surface 348' FSL and 1252' FEL Section 28, T23N, R6W SESE At proposed prod. zone 2330' FNL and 450' FEL Section 4, T22N, R6W SENE		10. Field and Pool, or Exploratory Lybrook Gallup
14. Distance in miles and direction from nearest town or post office* +/- 55.3 miles southeast of the intersection of US Hwy 550 & US Hwy 64 in Bloomfield, NM		11. Sec., T. R. M. or Blk. and Survey or Area SHL-Section 28, T23N, R6W NMPM BHL-SEC 4 T22N R6W
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) BHL is 450' from east lease line	16. No. of acres in lease NMNM 112953-1,760 acres NMNM 109386-1,286 acres 1286.28	17. Spacing Unit dedicated to this well 240 acres - E/2 E/2 Section 33 240.83 E/2 NE/4 Section 4
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. GCU H33-2306 01H is +/- 509' east	19. Proposed Depth 5,637' TVD/13,690' MD	20. BLM/BIA Bond No. on file COB-000235
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 7,211' GL, 7,227' KB	22. Approximate date work will start* 12/24/2014	23. Estimated duration 25 days
24. Attachments		UCL CONS. DIV. DIST. 3

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, must be attached to this form:

- Well plat certified by a registered surveyor.
- A Drilling Plan.
- A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
- Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
- Operator certification
- Such other site specific information and/or plans as may be required by the BLM.

25. Signature <i>Brenda R. Linster</i>	Name (Printed/Typed) Brenda R. Linster	Date 09/25/13
Title Regulatory Lead		
Approved by (Signature) <i>[Signature]</i>	Name (Printed/Typed) AFM	Date 12/27/13
Title AFM	Office FFO	

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Conditions of approval, if any, are attached.

BLM'S APPROVAL OR ACCEPTANCE OF THIS

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212 make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

**AUTHORIZATION REQUIRED FOR OPERATIONS
ON FEDERAL AND INDIAN LANDS**

(Continued on page 2)
This action is subject to technical and procedural review pursuant to 43 CFR 3165.3 and appeal pursuant to 43 CFR 3165.4

NMCCD
A

**DRILLING OPERATIONS
AUTHORIZED ARE SUBJECT TO
COMPLIANCE WITH ATTACHED
"GENERAL REQUIREMENTS"**

DISTRICT I
 1625 N. Church Drive, Hobbs, NM 88240
 Phone (505) 393-5161 Fax (505) 393-0720
 DISTRICT II
 411 S. First Street, Artesia, NM 88210
 Phone (505) 748-1283 Fax (505) 748-8720
 DISTRICT III
 1000 Rio Brazos Road, Aztec, NM 87410
 Phone (505) 334-6178 Fax (505) 334-6170
 DISTRICT IV
 1220 S. St. Francis Drive, Santa Fe, NM 87505
 Phone (505) 476-3460 Fax (505) 476-3462

State of New Mexico
 Energy, Minerals & Natural Resources Department

Form CM-102
 Revised August 1, 2011

Submit one copy to
 Appropriate District Office

OIL CONSERVATION DIVISION

1220 South St. Francis Drive
 Santa Fe, NM 87505

RECEIVED

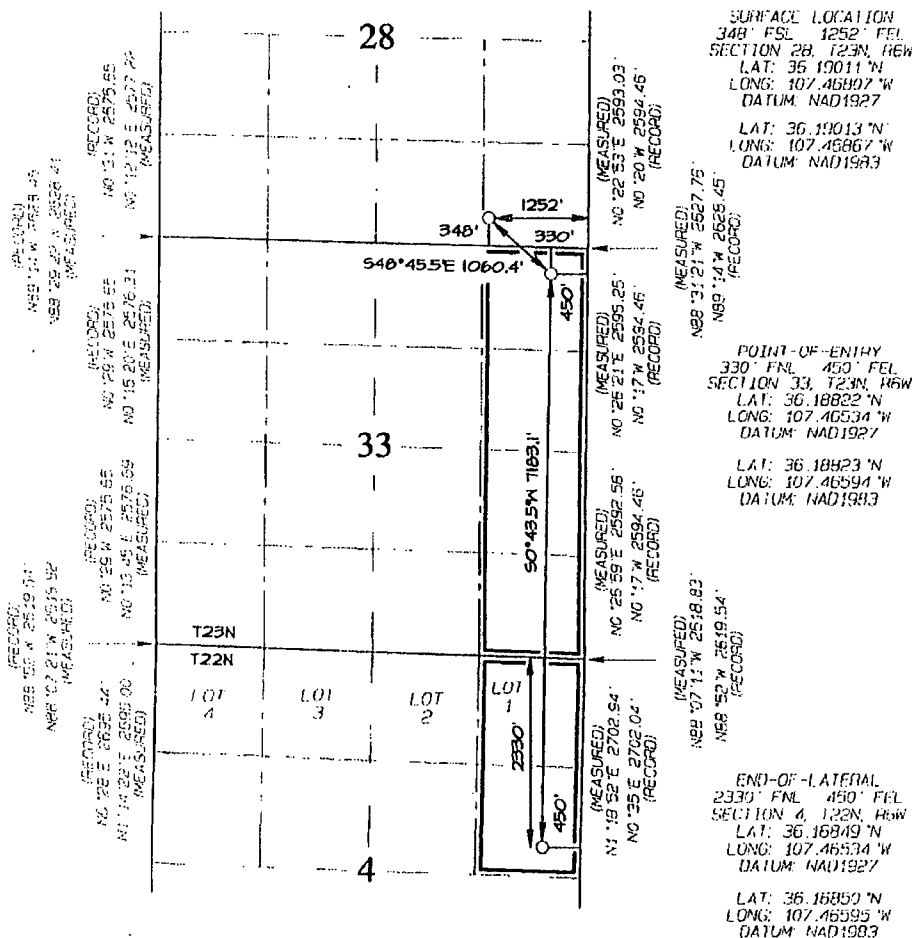
SEP 26 2013

WELL LOCATION AND ACREAGE DEDICATION PLAT

*API Number 30-043-21177	*Pool Code 42289	*Pool Name LYBROOK GALL	Farmington Field Office Bureau of Land Management
*Property Code 40321	*Property Name LYBROOK P28-2306		*Well Number 02H
*Operator Name ENCANA OIL & GAS (USA) INC.			*Elevation 7211'

10 Surface Location									
U.S. Loc. No.	Section	Township	Range	Lot	Feet from the	North/South Line	Feet from the	East/West Line	County
P	28	22N	6W		348	SOUTH	1252	EAST	SANDOVAL
11 Bottom Hole Location If Different From Surface									
U.S. Loc. No.	Section	Township	Range	Lot	Feet from the	North/South Line	Feet from the	East/West Line	County
H	4	22N	6W		2330	NORTH	450	EAST	SANDOVAL
12 Dedicated Acres 240.83 Acres E/2 E/2 - Section 33 E/2 NE/4 - Section 4					13 Joint or Initial	14 Consolidation Code	15 Order No.		

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



17 OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief and that this organization either owns a working interest, or released mineral interest in the land including the proposed bottom-hole location or has a right to drill this well at this location pursuant to a contract with the owner of such a mineral or working interest, or to a voluntary pooling agreement or a consolidation pooling order heretofore entered by this Division.

Signature: *Brenda Linster* Date: 09/25/13

Printed Name: Brenda H. Linster

E-mail Address: brenda.linster@encana.com

18 SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision and that the same is true and correct to the best of my belief.

Date Revised: AUGUST 26, 2013
 Survey Date: OCTOBER 2, 2012

Signature and Seal of Professional Surveyor:



JASON C. EDWARDS
 Certificate Number 15269

Directions from the Intersection of US Hwy 550 & US Hwy 64

in Bloomfield, NM to Encana Oil & Gas (USA) Inc. Lybrook P28-2306 02H

348' FSL & 1252' FEL, Section 28, T23N, R6W, N.M.P.M., Sandoval County, NM

Latitude: 36.19013°N Longitude: 107.46867°W Datum: NAD1983

From the intersection of US Hwy 550 & US Hwy 64 in Bloomfield, NM, travel Southerly on US Hwy 550 for 53.6 miles to Mile Marker 97.7;

Go right (South-easterly) on Indian Service Route #474 for 0.8 miles to an unimproved roadway on right-hand side which continues for 2484' to fork in proposed roadway;

Go right (Westerly) along proposed roadway for an additional 2324' to staked Encana Lybrook P28-2306 02H location.

encana

SANDOVAL COUNTY,
NEW MEXICO

- ⊗ Abandoned
 - ⊗ Abandoned Gas
 - ⊗ Abandoned Oil
 - ⊗ Dry Hole
 - ⊗ GAS
 - ⊗ Injection
 - OIL
- 1 inch = 2,167 feet

Basin Mancos
Gas Pool

LYBROOK-B 1 LU-LU 2
Lybrook L29-2306 01H

LYBROOK

**GALLUP
POOL**

Lybrook D32-2306 01H

GUS YJ STATE 1

LU LU 3

LU-LU 4

OLU LU 5

LU LU 6

Lybrook M28-2306 01H
Lybrook M28-2306 02H
Lybrook M28-2306 03H
Lybrook M28-2306 04H

Lybrook
A32-2306 01H

PINON TANK
ABZ FED 1

Lybrook I32-2306 01H

Lybrook I32-2306 01H
Lybrook I32-2306 02H

DOME ETAL FED-33 1

DOME-FEDERAL
28-23 2

28

DOME ETAL
FED 28-1

DOME FEDERAL 28-23 1

Lybrook P28-2306 01H
Lybrook P28-2306 03H
Lybrook P28-2306 04H

Lybrook E27-2306 01H
Lybrook E27-2306 03H
Lybrook E27-2306 04H

Lybrook M27-2306 01H
Lybrook M27-2306 02H
Lybrook M27-2306 03H
Lybrook M27-2306 04H

Lybrook P28-2306 02H

GCU H33-2306 01H

MADDOX F-A 1

Lybrook
A03-2206 01H

Lybrook
H03-2206 01H

Lybrook P03-2206 01H
Lybrook P03-2206 03H

HUSTON ANS FEDERAL 1

LOGOS

22N
6W

23N
6W

**COUNSELORS
GALLUP
DAKOTA POOL**

0 0.125 0.25 0.5 Miles

Lybrook P28-2306 02H

SHL: SESE Section 28, T23N, R6W
348 FSL and 1252 FEL

BHL: SENE Section 4, T22N, R6W
2330 FNL and 450 FEL

Sandoval, New Mexico

Lease Number: NMNM 112953 & NMNM 109386

Encana Oil & Gas (USA) Inc. Drilling Plan

1. ESTIMATED TOPS OF GEOLOGICAL MARKERS (TVD)

The estimated tops of important geologic markers are as follows:

Formation	Depth (TVD) units = feet
Ojo Alamo Ss.	1,606
Kirtland Shale	1,758
Fruitland Coal	2,001
Pictured Cliffs Ss.	2,168
Lewis Shale	2,294
Cliffhouse Ss.	3,005
Menefee Fn.	3,699
Point Lookout Ss.	4,395
Mancos Shale	4,538
Mancos Silt	5,182
Gallup Fn.	5,427

The referenced surface elevation is 7,211', KB 7,227'

2. ESTIMATED DEPTH OF POTENTIAL WATER, OIL, GAS, & OTHER MINERAL BEARING FORMATIONS

Substance	Formation	Depth (TVD) units = feet
Water/Gas	Fruitland Coal	2,001
Oil/Gas	Pictured Cliffs Ss.	2,168
Oil/Gas	Cliffhouse Ss.	3,005
Gas	Menefee Fn.	3,699
Oil/Gas	Point Lookout Ss.	4,395
Oil/Gas	Mancos Shale	4,538
Oil/Gas	Mancos Silt	5,182
Oil/Gas	Gallup Fn.	5,427

All shows of fresh water and minerals will be reported and protected.

3. PRESSURE CONTROL

- a) Pressure control equipment and configuration will be designed to meet 2M standards.
- b) Working pressure on rams and BOPE will be 3,000 psi
- c) Function test and visual inspection of the BOP will be conducted daily and noted in the IADC Daily Drilling Report.

Lybrook P28-2306 02H**SHL: SESE Section 28, T23N, R6W
348 FSL and 1252 FEL****BHL: SENE Section 4, T22N, R6W
2330 FNL and 450 FEL****Sandoval, New Mexico****Lease Number: NMNM 112953 & NMNM 109386**

- d) The Annular BOP will be pressure tested to a minimum of 50 percent of its rated working pressure.
- e) Blind and Pipe Rams/BOP will be tested against a test plug to 100 percent of rated working pressure.
- f) Pressure tests are required before drilling out from under all casing strings set and cemented in place.
- g) BOP controls must be installed prior to drilling the surface casing plug and will remain in use until the well is completed or abandoned.
- h) BOP testing procedures and testing frequency will conform to Onshore Order No. 2.
- i) BOP remote controls shall be located on the rig floor at a location readily accessible to the driller. Master controls shall be on the ground at the accumulator and shall have the capability to function all preventers.
- j) The kill line shall be 2-inch minimum and contain two kill line valves, one of which shall be a check valve.
- k) The choke line shall be a 2-inch minimum and contain two choke line valves (2-inch minimum).
- l) The choke and manifold shall contain two adjustable chokes.
- m) Hand wheels shall be installed on all ram preventers.
- n) Safety valves and wrenches (with subs for drill string connections) shall be available on the rig floor at all times.
- o) Inside BOP or float sub shall also be available on the rig floor at all times.

Proposed BOP and choke manifold arrangements are attached.

4. CASING & CEMENTING PROGRAM

The proposed casing and cementing program has been designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement shall receive approval prior to use. The casing setting depth shall be calculated to position the casing seat opposite a competent formation which will contain the maximum pressure to which it will be exposed during normal drilling operations. All indications of useable water shall be reported.

- a) The proposed casing design is as follows:

Casing	Depth	Hole Size	Csg Size	Weight	Grade
Conductor	0-60'	30"	20"	94#	H40, STC New
Surface	0'-500'	12 1/4"	9 5/8"	36#	J55, STC New
Intermediate	0'-6412'MD	8 3/4"	7"	26#	J55, LTC New
Production Liner	6212'-13690'MD	6 1/8"	4 1/2"	11.6#	B80*, LTC New

Casing String				Casing Strength Properties			Minimum Design Factors		
Size	Weight (lb/ft)	Grade	Connection	Collapse (psi)	Burst (psi)	Tensile (1000lb)	Collapse	Burst	Tension
9 5/8"	36	J55	STC	2020	3520	394	1.125	1.1	1.5
7"	26	J55	LTC	4320	4980	367	1.125	1.1	1.5
4 1/2"	11.6	B80	LTC	6350	7780	201	1.125	1.1	1.5

*B80 pipe specifications are attached

Casing design is subject to revision based on geologic conditions encountered.

Lybrook P28-2306 02H**SHL: SESE Section 28, T23N, R6W
348 FSL and 1252 FEL****BHL: SENE Section 4, T22N, R6W
2330 FNL and 450 FEL****Sandoval, New Mexico****Lease Number: NMNM 112953 & NMNM 109386**

All casing strings below the conductor shall be pressure tested to 0.22 psi per foot of casing string length or 1,500 psi, whichever is greater, but not to exceed 70 percent of the minimum internal yield. If pressure declines more than 10 percent in 30 minutes, corrective action shall be taken.

b) The proposed cementing program is as follows:

Top plugs shall be used to reduce contamination of cement by displacement fluid. A bottom plug or other acceptable technique, such as a pre-flush fluid, inner string cement method, etc. shall be utilized to help isolate the cement from contamination by the mud fluid being displaced ahead of the cement slurry.

Casing	Depth	Cement Volume (sacks)	Cement Type&Yield	Designed TOC	Centralizers
Conductor	60'	100sk	Type I Neat 16.0 ppg	Surface	None
Surface	500'	178sk	Type III Cement + 1% CaCl + 0.25lb/sk Cello Flake + 0.2% FL, 14.6ppg, 1.38cuf/sk	Surface	1 per joint on bottom 3 joints
Intermediate	6412'MD	30% open hole excess Stage 1 Lead: 227sks Stage 1 Tail: 157sks Stage 2 Lead: 172sks	Lead (Stages 1 and 2): PremLite + 3% CaCl + 0.25lb/sk CelloFlake + 5lb/sk LCM, 12.1ppg 2.13cuf/sk Tail (Stage 1): Type III Cmt + 1% CaCl + 0.25lb/sk Cello Flake 14.5ppg 1.38cuf/sk	Surface	1 per joint for bottom 3 joints, 1 every 3 joints for remaining joints
Production Liner*	6212'-13690'	None – External casing packers	N/A	N/A	N/A

*Production liner clarification: Utilizing external swell casing packer system for zonal isolation will not use cement in the production liner.

Actual volumes will be calculated and determined by conditions onsite. All cement slurries will meet or exceed minimum BLM and New Mexico Oil Conservation Division requirements. Slurries used will be the slurries listed above or equivalent slurries depending on service provider selected. Cement yields may change depending on slurries selected.

All waiting on cement times shall be a minimum of 8 hours or adequate to achieve a minimum of 500 psi compressive strength at the casing shoe prior to drilling out.

5. WELL PLAN & DIRECTIONAL DRILLING PROGRAM

The proposed horizontal well will have a kick off point of 5016'. Directional plans are attached.

Lybrook P28-2306 02H

SHL: SESE Section 28, T23N, R6W
348 FSL and 1252 FEL

BHL: SENE Section 4, T22N, R6W
2330 FNL and 450 FEL

Sandoval, New Mexico

Lease Number: NMNM 112953 & NMNM 109386

Description	Proposed Depth (TVD/MD)	Formation
Horizontal Lateral TD	5637'/13690'	Gallup

6. DRILLING FLUIDS PROGRAM

a) Surface through Intermediate Casing Point:

Hole Size (in)	Depth (ft)	Mud Type	Density (lb/gal)	Viscosity (sec/qt)	Fluid Loss (cc)
30"	0-60' TVD	Fresh Water	8.3-9.2	38-100	4-28
12 1/4"	0-500' TVD	Fresh Water	8.4-8.6	60-70	NC
8 3/4"	500'TVD- 5660'TVD/6412'MD	Fresh Water LSND	8.5-8.8	40-50	8-10

b) Intermediate Casing Point to TD:

Hole Size (in)	MD (ft)	Mud Type	Density (lb/gal)	Viscosity (sec/qt)	Fluid Loss (cc)
6 1/8"	6412'-13690'	Synthetic Oil Based Mud	8.6-9.0	15-25	<15

- c) There will be sufficient mud on location to control a blowout should one occur. Mud flow and volume will be monitored both visually and with electronic pit volume totalizers. Mud tests shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.
- d) A closed-loop system will be used to recover drilling fluid and dry cuttings in both phases of the well and on all hole intervals, including fresh water and oil-based operations. Above-ground tanks will be utilized to hold cuttings and fluids for rig operations. A frac tank will be on location to store fresh water. Waste will be disposed of properly at an EPA-approved hazardous waste facility. Fresh water cuttings will be disposed of at Basin Disposal, Inc. and/or Industrial Ecosystems, Inc. The location will be lined in accordance with the Surface Use Plan of Operations.

7. TESTING, CORING and LOGGING

- a) Drill Stem Testing – None anticipated
- b) Coring – None anticipated.
- c) Mud Logging – Mud loggers will be on location from kick off point to TD.
- d) Logging – See Below

Cased Hole:

CBL/CCL/GR/VDL will be run as needed for perforating control

Lybrook P28-2306 02H

**SHL: SESE Section 28, T23N, R6W
348 FSL and 1252 FEL**

**BHL: SENE Section 4, T22N, R6W
2330 FNL and 450 FEL**

Sandoval, New Mexico

Lease Number: NMNM 112953 & NMNM 109386

8. ABNORMAL PRESSURES & HYDROGEN SULFIDE

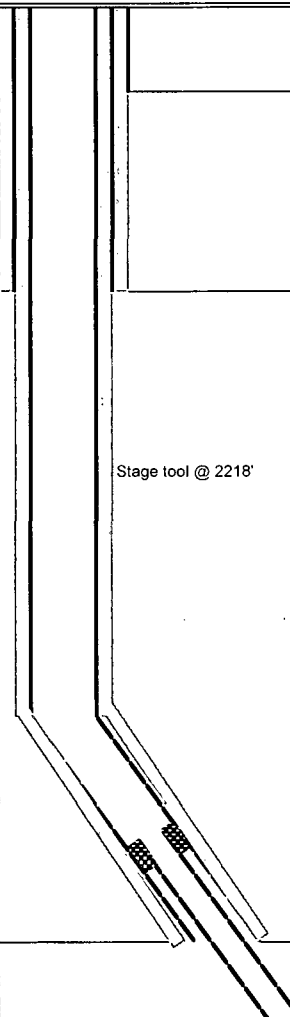
The anticipated bottom hole pressure is +/- 2650 psi based on a 9.0 ppg at 5662' TVD of the landing point of the horizontal lateral. No abnormal pressure or temperatures are anticipated.

No hydrogen sulfide gas is anticipated, however, if H₂S is encountered, the guidelines in Onshore Order No. 6 will be followed.

9. ANTICIPATED START DATE AND DURATION OF OPERATIONS

Drilling is estimated to commence on December 24, 2014. It is anticipated that completion operations will begin within 30 days after the well has been drilled depending on fracture treatment schedules with various pumping service companies.

It is anticipated that the drilling of this well will take approximately 25 days.

LOC: Sec 28-T23N-R6W County: Sandoval WELL: Lybrook P28-2306 02H			Encana Natural Gas WELL SUMMARY			encana		ENG: 9/25/13 RIG: GLE: 7211 RKBE: 7227	
MWD LWD	OPEN HOLE LOGGING	FORM	DEPTH			HOLE SIZE	CASING SPECS	MW MUD TYPE	DEVIATION INFORMATION
			TVD	MD					
			60	60'		30	20" 94# 100sx Type I Neat 16.0ppg cmt	Fresh wtr 8.3-9.2	
Surveys After csg is run	None		500	500		12 1/4	9 5/8" 36ppf J55 STC TOC @ surface 178 sks Type III Cmt	Fresh wtr 8.4-8.6	Vertical <1°
Surveys every 500'	No OH logs Mud logger onsite	Ojo Alamo Kirtland Fruitland Coal Pictured Cliffs Ss Lewis Shale Cliffhouse Ss Menefee Fn Point Lookout Ss Mancos Sh KICK OFF PT Mancos Silt Gallup Top 7" csg setting	1606 1758 2001 2168 2294 3005 3699 4395 4538 5016 5182 5427 5660	6412		8 3/4	7" 26ppf J55 LTC TOC @ surface 30% OH excess: 556 sksTotal. Stage 1 Lead: 227sks Stage 1 Tail: 157sks. Stage 2 Lead: 172sks	Fresh Wtr 8.5-8.8	Vertical <1° KOP 5016 10 deg/100'
Surveys every 500' Gyro at CP MWD Gamma Directional	No OH Logs	horz target Base Gallup	5662 5732	6507		6 1/8	200' overlap at liner top 7183' Lateral 4 1/2" 11.6ppf SB80 LTC Running external swellable csg packers for isolation of prod string Plan on setting top packer within 100' of intermediate casing shoe	8.6-9.0 OBM Switch to OBM 8.6-9.0	.25deg updip 5637' TVD TD = 13690' MD

NOTES:

- 1) Drill with 30" bit to 60', set 20" 94# conductor pipe
- 2) Drill surface to 500', R&C 9 5/8" casing
- 3) N/U BOP and surface equipment
- 4) Drill to KOP of 5016', 8 3/4" hole size,
- 5) PU directional tools and start curve at 10deg/100' build rate
- 6) Drill to casing point of 6412' MD
- 7) R&C 7" casing, circ cmt to surface, switch to OBM
- 8) Land at 90deg, drill 7183' lateral to 13690', run 4 1/2" liner with external swellable csg packers



Boomerang Tube LLC

CASING (OR) TUBING DESCRIPTION AND PERFORMANCE PROPERTIES

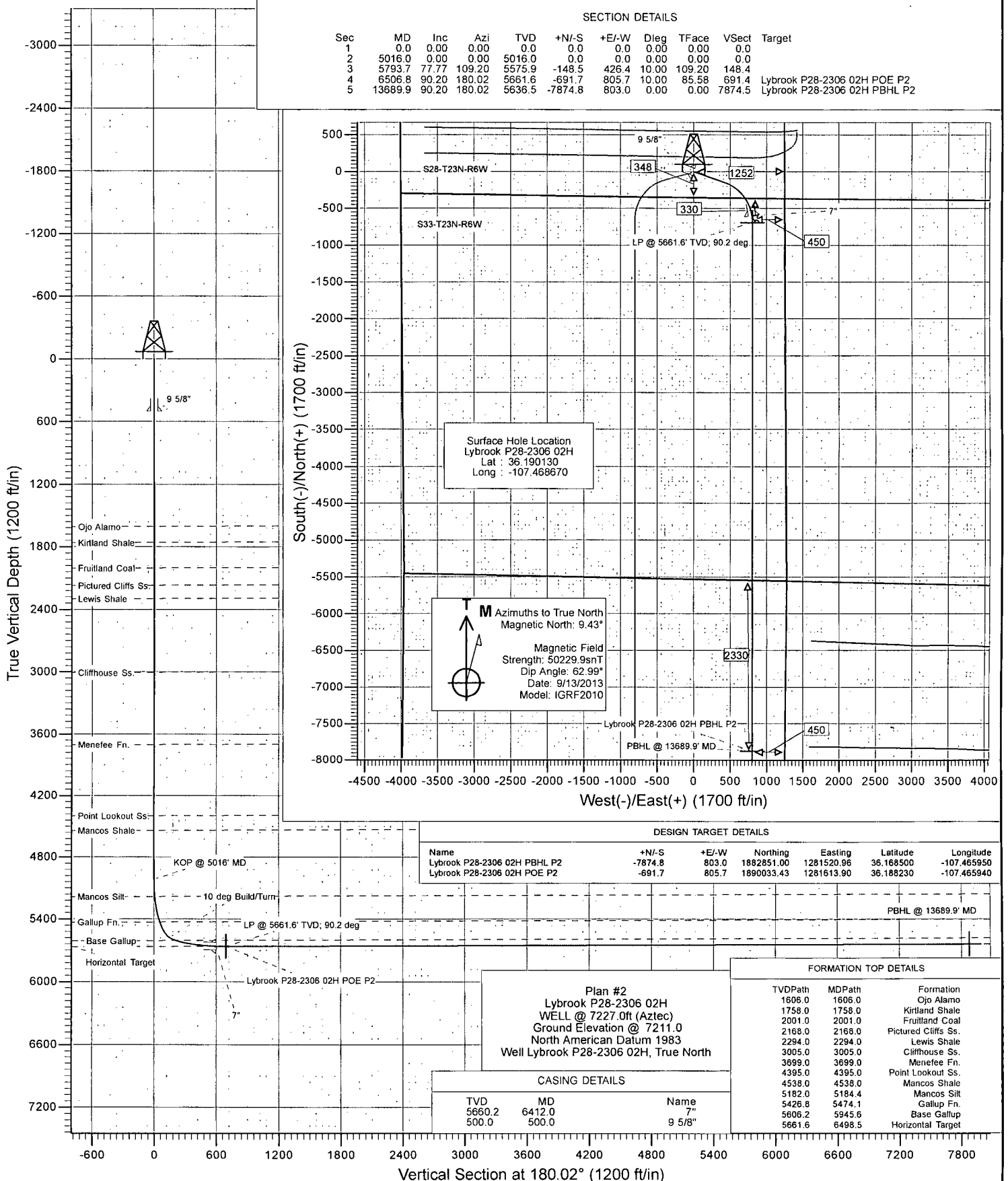
Pipe Outside Diameter (ins)	_____	4.500
Pipe Wall Thickness (ins)	_____	0.250
Nominal Weight Per Foot (lbs)	_____	11.60
Thread Name	_____	Long Thread CSG
Grade Name	_____	SB-80
Pipe Minimum Yield (psi)	_____	80,000
Pipe Minimum Ultimate (psi)	_____	90,000
Coupling Minimum Yield (psi)	_____	80,000
Coupling Minimum Ultimate (psi)	_____	100,000
Coupling or Joint Outside Diameter (ins)	_____	5.000
Drift Diameter (ins)	_____	3.875
Plain End Weight per Foot (lbs)	_____	11.36
Joint Strength (lbs)	_____	201,000
Internal Yield (psi)	_____	7,780
Collapse Rating (psi)	_____	6,350

MAXIMUM DEPTH/LENGTH BASED ON MUD WTS & SAFETY FACTORS

Drilling Mud Weight (ppg)	_____	9.625
Tension Safety Factor	_____	1.80
Maximum Tension Length (ft)	_____	9,630
Internal Yield Safety Factor	_____	1.10
Maximum Depth for Internal Yield (ft)	_____	14,150
Collapse Safety Factor	_____	1.125
Maximum Collapse Depth (ft)	_____	11,290

API RELATED VALUES and INTERMEDIATE CALCULATION RESULTS

Coupling Thread Fracture Strength	_____	464,000
Pipe Thread Fracture Strength (lbs)	_____	201,000
Pipe Body Plain End Yield (lbs)	_____	267,000
Round Thread Pull-Out (lbs)	_____	219,000
Minimum Make-up Torque (ft-lbs)	_____	1,640
Nominal Make-up Torque (ft-lbs)	_____	2,190
Maximum Make-up Torque (ft-lbs)	_____	2,740
Coupling Internal Yield (psi)	_____	10,660
Pipe Body Internal Yield (psi)	_____	7,780
Leak @ E1 or E7 plane (psi)	_____	17,920
Pipe Hydrostatic Test Pressure @ 80 % SMYS	_____	7,100



Planning Report

Database: USA EDM 5000 Multi Users DB
 Company: EnCana Oil & Gas (USA) Inc
 Project: Sandoval County, NM
 Site: Lybrook
 Well: Lybrook P28-2306 02H
 Wellbore: HZ
 Design: Plan #2

Local Co-ordinate Reference: Well Lybrook P28-2306 02H
 TVD Reference: WELL @ 7227.0ft (Aztec)
 MD Reference: WELL @ 7227.0ft (Aztec)
 North Reference: True
 Survey Calculation Method: Minimum Curvature

Project	Sandoval County, NM		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Central Zone		

Site	Lybrook				
Site Position:		Northing:	1,882,676.45 ft	Latitude:	36.168210
From:	Lat/Long	Easting:	1,287,068.90 ft	Longitude:	-107.447150
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-0.71 °

Well	Lybrook P28-2306 02H					
Well Position	+N/-S	0.0 ft	Northing:	1,890,735.22 ft	Latitude:	36.190130
	+E/-W	0.0 ft	Easting:	1,280,816.97 ft	Longitude:	-107.468670
Position Uncertainty	0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,211.0 ft	

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/13/2013	9.43	62.99	50,230

Design	Plan #2			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	0.0	0.0	0.0	180.02

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
5,016.0	0.00	0.00	5,016.0	0.0	0.0	0.00	0.00	0.00	0.00	
5,793.7	77.77	109.20	5,575.9	-148.5	426.4	10.00	10.00	0.00	109.20	
6,506.8	90.20	180.02	5,661.6	-691.7	805.7	10.00	1.74	9.93	85.58	Lybrook P28-2306 02
13,689.9	90.20	180.02	5,636.5	-7,874.8	803.0	0.00	0.00	0.00	0.00	Lybrook P28-2306 02

Planning Report

Database: USA EDM 5000 Multi Users DB
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 Project: Sandoval County, NM
 Site: Lybrook
 Well: Lybrook P28-2306 02H
 Wellbore: HZ
 Design: Plan #2

Local Co-ordinate Reference: Well Lybrook P28-2306 02H
 TVD Reference: WELL @ 7227.0ft (Aztec)
 MD Reference: WELL @ 7227.0ft (Aztec)
 North Reference: True
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	9 5/8"
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	
1,606.0	0.00	0.00	1,606.0	0.0	0.0	0.0	0.00	0.00	Ojo Alamo
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	
1,758.0	0.00	0.00	1,758.0	0.0	0.0	0.0	0.00	0.00	Kirtland Shale
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	
2,001.0	0.00	0.00	2,001.0	0.0	0.0	0.0	0.00	0.00	Fruitland Coal
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	
2,168.0	0.00	0.00	2,168.0	0.0	0.0	0.0	0.00	0.00	Pictured Cliffs Ss.
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	
2,294.0	0.00	0.00	2,294.0	0.0	0.0	0.0	0.00	0.00	Lewis Shale
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	
3,005.0	0.00	0.00	3,005.0	0.0	0.0	0.0	0.00	0.00	Cliffhouse Ss.
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	
3,699.0	0.00	0.00	3,699.0	0.0	0.0	0.0	0.00	0.00	Menefee Fn.
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	
4,395.0	0.00	0.00	4,395.0	0.0	0.0	0.0	0.00	0.00	Point Lookout Ss.

Planning Report

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 Well: Lybrook P28-2306 02H
 Wellbore: HZ
 Design: Plan #2

Local Co-ordinate Reference: Well Lybrook P28-2306 02H
 TVD Reference: WELL @ 7227.0ft (Aztec)
 MD Reference: WELL @ 7227.0ft (Aztec)
 North Reference: True
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	
4,538.0	0.00	0.00	4,538.0	0.0	0.0	0.0	0.00	0.00	Mancos Shale
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	
5,016.0	0.00	0.00	5,016.0	0.0	0.0	0.0	0.00	0.00	KOP @ 5016' MD
5,100.0	8.40	109.20	5,099.7	-2.0	5.8	2.0	10.00	10.00	
5,184.4	16.84	109.20	5,182.0	-8.1	23.2	8.1	10.00	10.00	Mancos Silt
5,200.0	18.40	109.20	5,196.9	-9.6	27.7	9.6	10.00	10.00	
5,300.0	28.40	109.20	5,288.5	-22.7	65.1	22.7	10.00	10.00	
5,400.0	38.40	109.20	5,371.9	-40.8	117.0	40.7	10.00	10.00	
5,474.1	45.81	109.20	5,426.8	-57.1	163.9	57.0	10.00	10.00	Gallup Fn.
5,500.0	48.40	109.20	5,444.5	-63.3	181.8	63.3	10.00	10.00	
5,600.0	58.40	109.20	5,504.0	-89.7	257.6	89.6	10.00	10.00	
5,700.0	68.40	109.20	5,548.7	-119.1	341.9	119.0	10.00	10.00	
5,793.7	77.77	109.20	5,575.9	-148.5	426.4	148.4	10.00	10.00	10 deg Build/Turn
5,800.0	77.82	109.85	5,577.3	-150.6	432.3	150.4	10.00	0.78	
5,900.0	78.79	120.01	5,597.6	-191.8	520.9	191.6	10.00	0.98	
5,945.6	79.36	124.62	5,606.2	-215.7	558.8	215.5	10.00	1.23	Base Gallup
6,000.0	80.11	130.09	5,615.9	-248.2	601.3	248.0	10.00	1.39	
6,100.0	81.73	140.09	5,631.8	-318.1	670.9	317.8	10.00	1.61	
6,200.0	83.59	150.00	5,644.6	-399.2	727.6	399.0	10.00	1.86	
6,300.0	85.63	159.83	5,654.0	-489.3	769.8	489.0	10.00	2.05	
6,400.0	87.81	169.61	5,659.7	-585.5	796.0	585.2	10.00	2.18	
6,412.0	88.07	170.78	5,660.2	-597.3	798.1	597.0	10.00	2.22	7"
6,498.5	90.01	179.21	5,661.6	-683.4	805.6	683.1	10.00	2.24	Horizontal Target
6,500.0	90.05	179.36	5,661.6	-684.9	805.6	684.6	10.00	2.25	
6,506.8	90.20	180.02	5,661.6	-691.7	805.7	691.4	10.00	2.25	LP @ 5661.6' TVD; 90.2 deg - Lybrook P28-2306
6,600.0	90.20	180.02	5,661.3	-784.9	805.6	784.6	0.00	0.00	
6,700.0	90.20	180.02	5,660.9	-884.9	805.6	884.6	0.00	0.00	
6,800.0	90.20	180.02	5,660.6	-984.9	805.6	984.6	0.00	0.00	
6,900.0	90.20	180.02	5,660.2	-1,084.9	805.5	1,084.6	0.00	0.00	
7,000.0	90.20	180.02	5,659.9	-1,184.9	805.5	1,184.6	0.00	0.00	
7,100.0	90.20	180.02	5,659.5	-1,284.9	805.5	1,284.6	0.00	0.00	
7,200.0	90.20	180.02	5,659.2	-1,384.9	805.4	1,384.6	0.00	0.00	
7,300.0	90.20	180.02	5,658.8	-1,484.9	805.4	1,484.6	0.00	0.00	
7,400.0	90.20	180.02	5,658.5	-1,584.9	805.3	1,584.6	0.00	0.00	
7,500.0	90.20	180.02	5,658.1	-1,684.9	805.3	1,684.6	0.00	0.00	
7,600.0	90.20	180.02	5,657.8	-1,784.9	805.3	1,784.6	0.00	0.00	
7,700.0	90.20	180.02	5,657.4	-1,884.9	805.2	1,884.6	0.00	0.00	
7,800.0	90.20	180.02	5,657.1	-1,984.9	805.2	1,984.6	0.00	0.00	
7,900.0	90.20	180.02	5,656.7	-2,084.9	805.2	2,084.6	0.00	0.00	
8,000.0	90.20	180.02	5,656.4	-2,184.9	805.1	2,184.6	0.00	0.00	
8,100.0	90.20	180.02	5,656.0	-2,284.9	805.1	2,284.6	0.00	0.00	
8,200.0	90.20	180.02	5,655.7	-2,384.9	805.0	2,384.6	0.00	0.00	
8,300.0	90.20	180.02	5,655.3	-2,484.9	805.0	2,484.6	0.00	0.00	
8,400.0	90.20	180.02	5,655.0	-2,584.9	805.0	2,584.6	0.00	0.00	
8,500.0	90.20	180.02	5,654.6	-2,684.9	804.9	2,684.6	0.00	0.00	
8,600.0	90.20	180.02	5,654.3	-2,784.9	804.9	2,784.6	0.00	0.00	

Planning Report

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 Project: Sandoval County, NM
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 Well: Lybrook P28-2306 02H
 Wellbore: HZ
 Design: Plan #2

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 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
8,700.0	90.20	180.02	5,653.9	-2,884.9	804.9	2,884.6	0.00	0.00	
8,800.0	90.20	180.02	5,653.6	-2,984.9	804.8	2,984.6	0.00	0.00	
8,900.0	90.20	180.02	5,653.2	-3,084.9	804.8	3,084.6	0.00	0.00	
9,000.0	90.20	180.02	5,652.9	-3,184.9	804.7	3,184.6	0.00	0.00	
9,100.0	90.20	180.02	5,652.5	-3,284.9	804.7	3,284.6	0.00	0.00	
9,200.0	90.20	180.02	5,652.2	-3,384.9	804.7	3,384.6	0.00	0.00	
9,300.0	90.20	180.02	5,651.8	-3,484.9	804.6	3,484.6	0.00	0.00	
9,400.0	90.20	180.02	5,651.5	-3,584.9	804.6	3,584.6	0.00	0.00	
9,500.0	90.20	180.02	5,651.1	-3,684.9	804.6	3,684.6	0.00	0.00	
9,600.0	90.20	180.02	5,650.8	-3,784.9	804.5	3,784.6	0.00	0.00	
9,700.0	90.20	180.02	5,650.4	-3,884.9	804.5	3,884.6	0.00	0.00	
9,800.0	90.20	180.02	5,650.1	-3,984.9	804.4	3,984.6	0.00	0.00	
9,900.0	90.20	180.02	5,649.7	-4,084.9	804.4	4,084.6	0.00	0.00	
10,000.0	90.20	180.02	5,649.4	-4,184.9	804.4	4,184.6	0.00	0.00	
10,100.0	90.20	180.02	5,649.0	-4,284.9	804.3	4,284.6	0.00	0.00	
10,200.0	90.20	180.02	5,648.7	-4,384.9	804.3	4,384.6	0.00	0.00	
10,300.0	90.20	180.02	5,648.3	-4,484.9	804.2	4,484.6	0.00	0.00	
10,400.0	90.20	180.02	5,648.0	-4,584.9	804.2	4,584.6	0.00	0.00	
10,500.0	90.20	180.02	5,647.6	-4,684.9	804.2	4,684.6	0.00	0.00	
10,600.0	90.20	180.02	5,647.3	-4,784.9	804.1	4,784.6	0.00	0.00	
10,700.0	90.20	180.02	5,646.9	-4,884.9	804.1	4,884.6	0.00	0.00	
10,800.0	90.20	180.02	5,646.6	-4,984.9	804.1	4,984.6	0.00	0.00	
10,900.0	90.20	180.02	5,646.2	-5,084.9	804.0	5,084.6	0.00	0.00	
11,000.0	90.20	180.02	5,645.9	-5,184.9	804.0	5,184.6	0.00	0.00	
11,100.0	90.20	180.02	5,645.6	-5,284.9	803.9	5,284.6	0.00	0.00	
11,200.0	90.20	180.02	5,645.2	-5,384.9	803.9	5,384.6	0.00	0.00	
11,300.0	90.20	180.02	5,644.9	-5,484.9	803.9	5,484.6	0.00	0.00	
11,400.0	90.20	180.02	5,644.5	-5,584.9	803.8	5,584.6	0.00	0.00	
11,500.0	90.20	180.02	5,644.2	-5,684.9	803.8	5,684.6	0.00	0.00	
11,600.0	90.20	180.02	5,643.8	-5,784.9	803.8	5,784.6	0.00	0.00	
11,700.0	90.20	180.02	5,643.5	-5,884.8	803.7	5,884.6	0.00	0.00	
11,800.0	90.20	180.02	5,643.1	-5,984.8	803.7	5,984.6	0.00	0.00	
11,900.0	90.20	180.02	5,642.8	-6,084.8	803.6	6,084.6	0.00	0.00	
12,000.0	90.20	180.02	5,642.4	-6,184.8	803.6	6,184.6	0.00	0.00	
12,100.0	90.20	180.02	5,642.1	-6,284.8	803.6	6,284.6	0.00	0.00	
12,200.0	90.20	180.02	5,641.7	-6,384.8	803.5	6,384.6	0.00	0.00	
12,300.0	90.20	180.02	5,641.4	-6,484.8	803.5	6,484.6	0.00	0.00	
12,400.0	90.20	180.02	5,641.0	-6,584.8	803.5	6,584.6	0.00	0.00	
12,500.0	90.20	180.02	5,640.7	-6,684.8	803.4	6,684.6	0.00	0.00	
12,600.0	90.20	180.02	5,640.3	-6,784.8	803.4	6,784.6	0.00	0.00	
12,700.0	90.20	180.02	5,640.0	-6,884.8	803.3	6,884.6	0.00	0.00	
12,800.0	90.20	180.02	5,639.6	-6,984.8	803.3	6,984.6	0.00	0.00	
12,900.0	90.20	180.02	5,639.3	-7,084.8	803.3	7,084.6	0.00	0.00	
13,000.0	90.20	180.02	5,638.9	-7,184.8	803.2	7,184.6	0.00	0.00	
13,100.0	90.20	180.02	5,638.6	-7,284.8	803.2	7,284.6	0.00	0.00	
13,200.0	90.20	180.02	5,638.2	-7,384.8	803.2	7,384.6	0.00	0.00	
13,300.0	90.20	180.02	5,637.9	-7,484.8	803.1	7,484.6	0.00	0.00	
13,400.0	90.20	180.02	5,637.5	-7,584.8	803.1	7,584.6	0.00	0.00	
13,500.0	90.20	180.02	5,637.2	-7,684.8	803.0	7,684.6	0.00	0.00	
13,600.0	90.20	180.02	5,636.8	-7,784.8	803.0	7,784.6	0.00	0.00	
13,689.9	90.20	180.02	5,636.5	-7,874.8	803.0	7,874.5	0.00	0.00	PBHL @ 13689.9' MD - Lybrook P28-2306 02H

Planning Report

Database: USA EDM 5000 Multi Users DB
Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Site: Lybrook
Well: Lybrook P28-2306 02H
Wellbore: HZ
Design: Plan #2

Local Co-ordinate Reference: Well Lybrook P28-2306 02H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature

Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Lybrook P28-2306 02H f - plan hits target center - Point	0.00	0.00	5,636.5	-7,874.8	803.0	1,882,851.00	1,281,520.96	36.168500	-107.465950
Lybrook P28-2306 02H f - plan hits target center - Point	0.00	0.00	5,661.6	-691.7	805.7	1,890,033.43	1,281,613.90	36.188230	-107.465940

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
500.0	500.0	9 5/8"	0.000	0.000
6,412.0	5,660.2	7"	0.000	0.000

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,606.0	1,606.0	Ojo Alamo		-0.20	180.02
1,758.0	1,758.0	Kirtland Shale		-0.20	180.02
2,001.0	2,001.0	Fruitland Coal		-0.20	180.02
2,168.0	2,168.0	Pictured Cliffs Ss.		-0.20	180.02
2,294.0	2,294.0	Lewis Shale		-0.20	180.02
3,005.0	3,005.0	Cliffhouse Ss.		-0.20	180.02
3,699.0	3,699.0	Menefee Fn.		-0.20	180.02
4,395.0	4,395.0	Point Lookout Ss.		-0.20	180.02
4,538.0	4,538.0	Mancos Shale		-0.20	180.02
5,184.4	5,182.0	Mancos Silt		-0.20	180.02
5,474.1	5,427.0	Gallup Fn.		-0.20	180.02
5,945.6	5,607.0	Base Gallup		-0.20	180.02
6,498.5	5,664.0	Horizontal Target		-0.20	180.02

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
5,016.0	5,016.0	0.0	0.0	KOP @ 5016' MD
5,793.7	5,575.9	-148.5	426.4	10 deg Build/Turn
6,506.8	5,661.6	-691.7	805.7	LP @ 5661.6' TVD; 90.2 deg
13,689.9	5,636.5	-7,874.8	803.0	PBHL @ 13689.9' MD



Cathedral Energy Services

Anticollision Report

Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Reference Site: Lybrook
Site Error: 0.0ft
Reference Well: Lybrook P28-2306 02H
Well Error: 0.0ft
Reference Wellbore: HZ
Reference Design: Plan #2

Local Co-ordinate Reference: Well Lybrook P28-2306 02H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA EDM 5000 Multi Users DB
Offset TVD Reference: Offset Datum

Reference	Plan #2		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	Systematic Ellipse
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date 9/13/2013				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.0	13,689.9	Plan #2 (HZ)	Geolink MWD	Geolink MWD	

Summary						
Site Name	Reference	Offset	Distance		Separation	Warning
	Measured	Measured	Between	Between		
Offset Well - Wellbore - Design	Depth	Depth	Centres	Ellipses	Factor	
	(ft)	(ft)	(ft)	(ft)		
Lybrook						
Lybrook A03-2206 01H - Hz - FINAL	12,185.0	9,565.0	818.6	689.8	6.359	CC
Lybrook A03-2206 01H - Hz - FINAL	12,200.0	9,565.0	818.7	689.7	6.348	ES
Lybrook A03-2206 01H - Hz - FINAL	12,300.0	9,565.0	826.6	695.9	6.324	SF
Lybrook H03-2206 01H - Hz - FINAL	13,629.3	9,870.0	794.4	640.1	5.150	CC, ES
Lybrook H03-2206 01H - HZ - FINAL	13,689.9	9,870.0	796.7	641.4	5.130	SF
Lybrook M27-2306 03H - Hz - Plan #1	5,200.0	6,405.9	578.5	534.4	13.136	SF
Lybrook M27-2306 03H - Hz - Plan #1	5,264.6	6,383.1	574.1	530.5	13.190	CC, ES
Lybrook M27-2306 04H - Hz - Plan #2	5,600.0	6,590.8	336.4	299.7	9.165	SF
Lybrook M27-2306 04H - Hz - Plan #2	5,619.7	6,574.7	336.0	299.4	9.175	CC, ES
Lybrook P28-2306 01H - Hz - Plan #1	4,947.9	4,947.9	32.9	15.7	1.912	CC, ES, SF



Cathedral Energy Services

Anticollision Report

Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Reference Site: Lybrook
Site Error: 0.0ft
Reference Well: Lybrook P28-2306 02H
Well Error: 0.0ft
Reference Wellbore: HZ
Reference Design: Plan #2

Local Co-ordinate Reference: Well Lybrook P28-2306 02H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: USA EDM 5000 Multi Users DB
Offset TVD Reference: Offset Datum

Offset Design Lybrook - Lybrook A03-2206 01H - Hz - FINAL													Offset Site Error:	0.0 ft
Survey Program: 510-MWD, 4726-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
11,700.0	5,643.5	9,565.0	5,334.7	106.3	110.0	-84.53	-6,369.9	1,618.4	951.5	831.2	120.30	7.909		
11,800.0	5,643.1	9,565.0	5,334.7	108.0	110.0	-84.53	-6,369.9	1,618.4	904.6	782.5	122.03	7.412		
11,900.0	5,642.8	9,565.0	5,334.7	109.8	110.0	-84.53	-6,369.9	1,618.4	866.8	743.0	123.77	7.003		
12,000.0	5,642.4	9,565.0	5,334.7	111.5	110.0	-84.53	-6,369.9	1,618.4	839.2	713.7	125.51	6.687		
12,100.0	5,642.1	9,565.0	5,334.7	113.2	110.0	-84.53	-6,369.9	1,618.4	823.0	695.7	127.24	6.468		
12,185.0	5,641.8	9,565.0	5,334.7	114.7	110.0	-84.53	-6,369.9	1,618.4	818.6	689.8	128.72	6.359 CC		
12,200.0	5,641.7	9,565.0	5,334.7	115.0	110.0	-84.53	-6,369.9	1,618.4	818.7	689.7	128.98	6.348 ES		
12,300.0	5,641.4	9,565.0	5,334.7	116.7	110.0	-84.53	-6,369.9	1,618.4	826.6	695.9	130.72	6.324 SF		
12,400.0	5,641.0	9,565.0	5,334.7	118.4	110.0	-84.53	-6,369.9	1,618.4	846.3	713.9	132.45	6.390		
12,500.0	5,640.7	9,565.0	5,334.7	120.1	110.0	-84.53	-6,369.9	1,618.4	877.1	742.9	134.19	6.536		
12,600.0	5,640.3	9,565.0	5,334.7	121.9	110.0	-84.53	-6,369.9	1,618.4	917.7	781.8	135.93	6.752		
12,700.0	5,640.0	9,565.0	5,334.7	123.6	110.0	-84.53	-6,369.9	1,618.4	967.1	829.4	137.67	7.025		



Cathedral Energy Services
Anticollision Report

Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Reference Site: Lybrook
Site Error: 0.0ft
Reference Well: Lybrook P28-2306 02H
Well Error: 0.0ft
Reference Wellbore: HZ
Reference Design: Plan #2

Local Co-ordinate Reference: Well Lybrook P28-2306 02H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA EDM 5000 Multi Users DB
Offset TVD Reference: Offset Datum

Offset Design Lybrook - Lybrook H03-2206 01H - HZ - FINAL													Offset Site Error:	0.0 ft
Survey Program: 556-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
13,100.0	5,638.6	9,870.0	5,397.0	130.5	117.3	-84.39	-7,814.1	1,593.6	954.6	809.5	145.06	6.580		
13,200.0	5,638.2	9,870.0	5,397.0	132.3	117.3	-84.39	-7,814.1	1,593.6	903.0	756.2	146.80	6.151		
13,300.0	5,637.9	9,870.0	5,397.0	134.0	117.3	-84.39	-7,814.1	1,593.6	859.9	711.4	148.54	5.789		
13,400.0	5,637.5	9,870.0	5,397.0	135.8	117.3	-84.39	-7,814.1	1,593.6	826.8	676.5	150.28	5.502		
13,500.0	5,637.2	9,870.0	5,397.0	137.5	117.3	-84.39	-7,814.1	1,593.6	804.8	652.8	152.02	5.295		
13,600.0	5,636.8	9,870.0	5,397.0	139.2	117.3	-84.39	-7,814.1	1,593.6	794.9	641.2	153.76	5.170		
13,629.3	5,636.7	9,870.0	5,397.0	139.7	117.3	-84.39	-7,814.1	1,593.6	794.4	640.1	154.26	5.150 CC, ES		
13,689.9	5,636.5	9,870.0	5,397.0	140.8	117.3	-84.39	-7,814.1	1,593.6	796.7	641.4	155.32	5.130 SF		



Cathedral Energy Services

Anticollision Report

Company: EnCana Oil & Gas (USA) Inc
 Project: Sandoval County, NM
 Reference Site: Lybrook
 Site Error: 0.0ft
 Reference Well: Lybrook P28-2306 02H
 Well Error: 0.0ft
 Reference Wellbore: HZ
 Reference Design: Plan #2

Local Co-ordinate Reference: Well Lybrook P28-2306 02H
 TVD Reference: WELL @ 7227.0ft (Aztec)
 MD Reference: WELL @ 7227.0ft (Aztec)
 North Reference: True
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA EDM 5000 Multi Users DB
 Offset TVD Reference: Offset Datum

Offset Design Lybrook - Lybrook M27-2306 03H - Hz - Plan #1														Offset Site Error:	0.0 ft
Survey Program: 0-MWD														Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance								Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor			
4,600.0	4,600.0	6,435.8	5,258.1	8.0	36.0	0.51	551.2	4.9	922.8	899.3	23.46	39.331			
4,700.0	4,700.0	6,435.4	5,258.1	8.2	36.0	0.54	551.2	5.2	844.7	821.1	23.62	35.762			
4,800.0	4,800.0	6,435.1	5,258.1	8.3	36.0	0.58	551.2	5.6	771.7	747.9	23.78	32.454			
4,900.0	4,900.0	6,434.7	5,258.1	8.5	35.9	0.61	551.2	5.9	705.3	681.4	23.93	29.468			
5,000.0	5,000.0	6,434.4	5,258.1	8.7	35.9	0.65	551.1	6.3	647.6	623.6	24.09	26.882			
5,016.0	5,016.0	6,434.3	5,258.1	8.7	35.9	0.66	551.1	6.3	639.4	615.3	24.12	26.511			
5,050.0	5,050.0	6,433.2	5,258.1	8.8	35.9	-110.18	551.1	7.4	623.1	578.5	44.68	13.945			
5,100.0	5,099.7	6,428.2	5,258.1	8.9	35.8	-111.71	551.1	12.4	603.1	558.5	44.58	13.528			
5,150.0	5,148.8	6,419.1	5,258.1	9.0	35.6	-112.27	550.9	21.6	588.1	543.8	44.36	13.258			
5,200.0	5,196.9	6,405.9	5,258.2	9.1	35.3	-111.91	550.8	34.7	578.5	534.4	44.04	13.136 SF			
5,250.0	5,243.5	6,388.8	5,258.2	9.2	34.8	-110.70	550.5	51.8	574.3	530.6	43.65	13.157			
5,264.6	5,256.9	6,383.1	5,258.2	9.2	34.7	-110.20	550.5	57.5	574.1	530.5	43.52	13.190 CC, ES			
5,300.0	5,288.5	6,368.0	5,258.3	9.3	34.3	-108.71	550.3	72.7	575.3	532.1	43.19	13.320			
5,350.0	5,331.4	6,343.4	5,258.4	9.5	33.8	-106.02	549.9	97.2	581.2	538.5	42.68	13.618			
5,400.0	5,371.9	6,315.5	5,258.5	9.8	33.1	-102.74	549.5	125.1	591.2	549.1	42.10	14.043			
5,450.0	5,409.7	6,284.3	5,258.6	10.1	32.4	-99.00	549.1	156.3	604.7	563.2	41.46	14.583			
5,500.0	5,444.5	6,250.1	5,258.7	10.4	31.5	-94.98	548.7	190.5	620.8	580.0	40.78	15.223			
5,550.0	5,476.0	6,213.2	5,258.8	10.9	30.7	-90.86	548.2	227.4	638.8	598.7	40.06	15.947			
5,600.0	5,504.0	6,173.9	5,259.0	11.4	29.7	-86.82	547.6	266.7	657.9	618.6	39.33	16.728			
5,650.0	5,528.3	6,132.3	5,259.1	12.0	28.8	-83.04	547.1	308.3	677.6	638.9	38.63	17.540			
5,700.0	5,548.7	6,089.0	5,259.3	12.8	27.7	-79.62	546.5	351.6	697.2	659.2	38.00	18.349			
5,750.0	5,565.1	6,044.1	5,259.4	13.5	26.7	-76.67	545.9	396.5	716.4	678.9	37.47	19.120			
5,793.7	5,575.9	6,004.0	5,259.6	14.3	25.8	-74.49	545.3	436.6	732.4	695.3	37.10	19.745			
5,800.0	5,577.3	5,998.1	5,259.6	14.4	25.6	-74.49	545.3	442.5	734.7	697.8	36.99	19.865			
5,850.0	5,587.6	5,952.6	5,259.7	15.3	24.6	-74.44	544.6	488.0	755.1	719.0	36.09	20.922			
5,900.0	5,597.6	5,908.8	5,259.9	16.2	23.6	-74.26	544.1	531.8	779.1	744.0	35.14	22.174			
5,950.0	5,607.1	5,867.1	5,260.0	17.1	22.6	-73.90	543.5	573.5	806.6	772.4	34.14	23.622			
6,000.0	5,615.9	5,827.6	5,260.2	18.0	21.7	-73.31	543.0	612.9	837.3	804.2	33.12	25.281			
6,050.0	5,624.2	5,790.9	5,260.3	18.8	20.9	-72.40	542.5	649.7	871.0	838.9	32.06	27.166			
6,100.0	5,631.8	5,757.0	5,260.4	19.6	20.1	-71.07	542.0	683.5	907.5	876.5	30.98	29.293			
6,150.0	5,638.6	5,726.4	5,260.5	20.4	19.5	-69.17	541.6	714.2	946.6	916.7	29.85	31.712			
6,200.0	5,644.6	5,699.2	5,260.6	21.2	18.9	-66.48	541.2	741.4	987.9	959.2	28.63	34.498			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Cathedral Energy Services
Anticollision Report

Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Reference Site: Lybrook
Site Error: 0.0ft
Reference Well: Lybrook P28-2306 02H
Well Error: 0.0ft
Reference Wellbore: HZ
Reference Design: Plan #2

Local Co-ordinate Reference: Well Lybrook P28-2306 02H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA EDM 5000 Multi Users DB
Offset TVD Reference: Offset Datum

Offset Design Lybrook - Lybrook M27-2306 04H - Hz - Plan #2													Offset Site Error: 0.0 ft
Survey Program: 0-MWD													Offset Well Error: 0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	
4,700.0	4,700.0	6,852.4	5,595.0	8.2	36.6	-0.20	201.8	-0.7	997.7	976.1	21.52	46.354	
4,800.0	4,800.0	6,852.1	5,595.0	8.3	36.6	-0.10	201.8	-0.3	900.0	878.3	21.67	41.531	
4,900.0	4,900.0	6,851.7	5,595.0	8.5	36.6	0.00	201.8	0.0	802.8	781.0	21.82	36.798	
5,000.0	5,000.0	6,851.4	5,595.1	8.7	36.6	0.10	201.8	0.4	706.5	684.5	21.96	32.165	
5,016.0	5,016.0	6,851.3	5,595.1	8.7	36.6	0.12	201.8	0.4	691.2	669.2	21.99	31.434	
5,050.0	5,050.0	6,850.2	5,595.1	8.8	36.6	-118.34	201.7	1.5	658.8	613.5	45.35	14.527	
5,100.0	5,099.7	6,845.2	5,595.1	8.9	36.5	-127.90	201.7	6.5	612.3	567.5	44.80	13.667	
5,150.0	5,148.8	6,836.0	5,595.1	9.0	36.2	-133.83	201.6	15.7	567.3	523.6	43.72	12.975	
5,200.0	5,196.9	6,822.9	5,595.2	9.1	35.9	-137.31	201.4	28.8	524.6	482.0	42.58	12.321	
5,250.0	5,243.5	6,805.8	5,595.2	9.2	35.5	-139.06	201.1	45.9	484.8	443.3	41.49	11.684	
5,300.0	5,288.5	6,784.9	5,595.3	9.3	35.1	-139.54	200.9	66.8	448.5	408.0	40.48	11.077	
5,350.0	5,331.4	6,760.4	5,595.4	9.5	34.5	-139.02	200.5	91.3	416.4	376.8	39.57	10.522	
5,400.0	5,371.9	6,732.5	5,595.5	9.8	33.8	-137.64	200.2	119.2	389.1	350.4	38.75	10.041	
5,450.0	5,409.7	6,701.3	5,595.6	10.1	33.1	-135.52	199.7	150.4	367.3	329.3	38.05	9.654	
5,500.0	5,444.5	6,667.1	5,595.7	10.4	32.3	-132.75	199.3	184.6	351.2	313.8	37.47	9.374	
5,550.0	5,476.0	6,630.2	5,595.8	10.9	31.5	-129.43	198.8	221.5	341.0	304.0	37.02	9.212	
5,600.0	5,504.0	6,590.8	5,596.0	11.4	30.6	-125.70	198.2	260.8	336.4	299.7	36.71	9.165 SF	
5,619.7	5,514.0	6,574.7	5,596.0	11.7	30.2	-124.15	198.0	277.0	336.0	299.4	36.63	9.175 CC, ES	
5,650.0	5,528.3	6,549.3	5,596.1	12.0	29.6	-121.72	197.7	302.4	336.9	300.4	36.52	9.226	
5,700.0	5,548.7	6,506.0	5,596.3	12.8	28.6	-117.70	197.1	345.7	341.7	305.3	36.41	9.384	
5,750.0	5,565.1	6,461.1	5,596.4	13.5	27.6	-113.82	196.5	390.6	350.0	313.6	36.38	9.621	
5,793.7	5,575.9	6,420.9	5,596.6	14.3	26.7	-110.70	196.0	430.7	359.4	323.1	36.37	9.882	
5,800.0	5,577.3	6,415.1	5,596.6	14.4	26.6	-110.59	195.9	436.6	361.0	324.7	36.26	9.954	
5,850.0	5,587.6	6,369.6	5,596.7	15.3	25.6	-109.79	195.3	482.1	375.7	340.3	35.36	10.624	
5,900.0	5,597.6	6,325.8	5,596.9	16.2	24.6	-109.06	194.7	525.9	395.0	360.6	34.40	11.480	
5,950.0	5,607.1	6,284.0	5,597.0	17.1	23.7	-108.43	194.1	567.6	418.6	385.2	33.42	12.524	
6,000.0	5,615.9	6,244.6	5,597.2	18.0	22.9	-107.91	193.6	607.0	446.3	413.8	32.46	13.748	
6,050.0	5,624.2	6,207.9	5,597.3	18.8	22.1	-107.49	193.1	643.8	477.9	446.3	31.56	15.140	
6,100.0	5,631.8	6,174.0	5,597.4	19.6	21.4	-107.18	192.6	677.6	512.9	482.2	30.78	16.664	
6,150.0	5,638.6	6,143.4	5,597.5	20.4	20.8	-106.97	192.2	708.3	551.2	521.0	30.14	18.286	
6,200.0	5,644.6	6,116.1	5,597.6	21.2	20.2	-106.85	191.8	735.5	592.2	562.5	29.66	19.968	
6,250.0	5,649.7	6,092.5	5,597.7	21.9	19.7	-106.83	191.5	759.1	635.6	606.3	29.34	21.665	
6,300.0	5,654.0	6,072.8	5,597.8	22.5	19.3	-106.94	191.2	778.9	681.1	651.9	29.16	23.356	
6,350.0	5,657.3	6,056.9	5,597.8	23.1	19.0	-107.29	191.0	794.7	728.3	699.2	29.07	25.051	
6,400.0	5,659.7	6,045.2	5,597.9	23.7	18.8	-108.14	190.9	806.5	776.7	747.7	28.99	26.796	
6,450.0	5,661.2	6,037.6	5,597.9	24.2	18.6	-110.69	190.8	814.1	826.0	797.3	28.70	28.779	
6,500.0	5,661.6	6,034.2	5,597.9	24.6	18.6	-129.13	190.7	817.4	875.9	850.6	25.23	34.712	
6,506.8	5,661.6	6,034.1	5,597.9	24.7	18.6	-142.88	190.7	817.5	882.7	861.0	21.71	40.660	
6,600.0	5,661.3	6,032.9	5,597.9	25.6	18.6	-140.08	190.7	818.8	975.9	952.6	23.28	41.912	



Cathedral Energy Services
Anticollision Report

Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Reference Site: Lybrook
Site Error: 0.0ft
Reference Well: Lybrook P28-2306 02H
Well Error: 0.0ft
Reference Wellbore: HZ
Reference Design: Plan #2

Local Co-ordinate Reference: Well Lybrook P28-2306 02H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: USA EDM 5000 Multi Users DB
Offset TVD Reference: Offset Datum

Offset Design Lybrook - Lybrook P28-2306 01H - HZ - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-Geolink MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)						
0.0	0.0	0.0	0.0	0.0	0.0	-116.26	-14.6	-29.5	32.9					
100.0	100.0	100.0	100.0	0.1	0.1	-116.26	-14.6	-29.5	32.9	32.6	0.29	112.235		
200.0	200.0	200.0	200.0	0.3	0.3	-116.26	-14.6	-29.5	32.9	32.3	0.64	51.238		
300.0	300.0	300.0	300.0	0.5	0.5	-116.26	-14.6	-29.5	32.9	31.9	0.99	33.196		
400.0	400.0	400.0	400.0	0.7	0.7	-116.26	-14.6	-29.5	32.9	31.6	1.34	24.551		
500.0	500.0	500.0	500.0	0.8	0.8	-116.26	-14.6	-29.5	32.9	31.2	1.69	19.479		
600.0	600.0	600.0	600.0	1.0	1.0	-116.26	-14.6	-29.5	32.9	30.9	2.04	16.143		
700.0	700.0	700.0	700.0	1.2	1.2	-116.26	-14.6	-29.5	32.9	30.5	2.39	13.783		
800.0	800.0	800.0	800.0	1.4	1.4	-116.26	-14.6	-29.5	32.9	30.2	2.74	12.025		
900.0	900.0	900.0	900.0	1.5	1.5	-116.26	-14.6	-29.5	32.9	29.8	3.09	10.665		
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	-116.26	-14.6	-29.5	32.9	29.5	3.43	9.581		
1,100.0	1,100.0	1,100.0	1,100.0	1.9	1.9	-116.26	-14.6	-29.5	32.9	29.1	3.78	8.697		
1,200.0	1,200.0	1,200.0	1,200.0	2.1	2.1	-116.26	-14.6	-29.5	32.9	28.8	4.13	7.963		
1,300.0	1,300.0	1,300.0	1,300.0	2.2	2.2	-116.26	-14.6	-29.5	32.9	28.4	4.48	7.342		
1,400.0	1,400.0	1,400.0	1,400.0	2.4	2.4	-116.26	-14.6	-29.5	32.9	28.1	4.83	6.812		
1,500.0	1,500.0	1,500.0	1,500.0	2.6	2.6	-116.26	-14.6	-29.5	32.9	27.7	5.18	6.353		
1,600.0	1,600.0	1,600.0	1,600.0	2.8	2.8	-116.26	-14.6	-29.5	32.9	27.4	5.53	5.952		
1,700.0	1,700.0	1,700.0	1,700.0	2.9	2.9	-116.26	-14.6	-29.5	32.9	27.0	5.88	5.598		
1,800.0	1,800.0	1,800.0	1,800.0	3.1	3.1	-116.26	-14.6	-29.5	32.9	26.7	6.23	5.285		
1,900.0	1,900.0	1,900.0	1,900.0	3.3	3.3	-116.26	-14.6	-29.5	32.9	26.3	6.58	5.004		
2,000.0	2,000.0	2,000.0	2,000.0	3.5	3.5	-116.26	-14.6	-29.5	32.9	26.0	6.93	4.752		
2,100.0	2,100.0	2,100.0	2,100.0	3.6	3.6	-116.26	-14.6	-29.5	32.9	25.6	7.27	4.524		
2,200.0	2,200.0	2,200.0	2,200.0	3.8	3.8	-116.26	-14.6	-29.5	32.9	25.3	7.62	4.317		
2,300.0	2,300.0	2,300.0	2,300.0	4.0	4.0	-116.26	-14.6	-29.5	32.9	24.9	7.97	4.128		
2,400.0	2,400.0	2,400.0	2,400.0	4.2	4.2	-116.26	-14.6	-29.5	32.9	24.6	8.32	3.955		
2,500.0	2,500.0	2,500.0	2,500.0	4.3	4.3	-116.26	-14.6	-29.5	32.9	24.2	8.67	3.795		
2,600.0	2,600.0	2,600.0	2,600.0	4.5	4.5	-116.26	-14.6	-29.5	32.9	23.9	9.02	3.649		
2,700.0	2,700.0	2,700.0	2,700.0	4.7	4.7	-116.26	-14.6	-29.5	32.9	23.5	9.37	3.513		
2,800.0	2,800.0	2,800.0	2,800.0	4.9	4.9	-116.26	-14.6	-29.5	32.9	23.2	9.72	3.386		
2,900.0	2,900.0	2,900.0	2,900.0	5.0	5.0	-116.26	-14.6	-29.5	32.9	22.8	10.07	3.269		
3,000.0	3,000.0	3,000.0	3,000.0	5.2	5.2	-116.26	-14.6	-29.5	32.9	22.5	10.42	3.159		
3,100.0	3,100.0	3,100.0	3,100.0	5.4	5.4	-116.26	-14.6	-29.5	32.9	22.1	10.77	3.057		
3,200.0	3,200.0	3,200.0	3,200.0	5.6	5.6	-116.26	-14.6	-29.5	32.9	21.8	11.11	2.961		
3,300.0	3,300.0	3,300.0	3,300.0	5.7	5.7	-116.26	-14.6	-29.5	32.9	21.4	11.46	2.871		
3,400.0	3,400.0	3,400.0	3,400.0	5.9	5.9	-116.26	-14.6	-29.5	32.9	21.1	11.81	2.786		
3,500.0	3,500.0	3,500.0	3,500.0	6.1	6.1	-116.26	-14.6	-29.5	32.9	20.7	12.16	2.706		
3,600.0	3,600.0	3,600.0	3,600.0	6.3	6.3	-116.26	-14.6	-29.5	32.9	20.4	12.51	2.631		
3,700.0	3,700.0	3,700.0	3,700.0	6.4	6.4	-116.26	-14.6	-29.5	32.9	20.0	12.86	2.559		
3,800.0	3,800.0	3,800.0	3,800.0	6.6	6.6	-116.26	-14.6	-29.5	32.9	19.7	13.21	2.491		
3,900.0	3,900.0	3,900.0	3,900.0	6.8	6.8	-116.26	-14.6	-29.5	32.9	19.4	13.56	2.427		
4,000.0	4,000.0	4,000.0	4,000.0	7.0	7.0	-116.26	-14.6	-29.5	32.9	19.0	13.91	2.366		
4,100.0	4,100.0	4,100.0	4,100.0	7.1	7.1	-116.26	-14.6	-29.5	32.9	18.7	14.26	2.308		
4,200.0	4,200.0	4,200.0	4,200.0	7.3	7.3	-116.26	-14.6	-29.5	32.9	18.3	14.60	2.253		
4,300.0	4,300.0	4,300.0	4,300.0	7.5	7.5	-116.26	-14.6	-29.5	32.9	18.0	14.95	2.201		
4,400.0	4,400.0	4,400.0	4,400.0	7.7	7.7	-116.26	-14.6	-29.5	32.9	17.6	15.30	2.150		
4,500.0	4,500.0	4,500.0	4,500.0	7.8	7.8	-116.26	-14.6	-29.5	32.9	17.3	15.65	2.103		
4,600.0	4,600.0	4,600.0	4,600.0	8.0	8.0	-116.26	-14.6	-29.5	32.9	16.9	16.00	2.057		
4,700.0	4,700.0	4,700.0	4,700.0	8.2	8.2	-116.26	-14.6	-29.5	32.9	16.6	16.35	2.013		
4,800.0	4,800.0	4,800.0	4,800.0	8.3	8.3	-116.26	-14.6	-29.5	32.9	16.2	16.70	1.971		
4,900.0	4,900.0	4,900.0	4,900.0	8.5	8.5	-116.26	-14.6	-29.5	32.9	15.9	17.05	1.930		
4,947.9	4,947.9	4,947.9	4,947.9	8.6	8.6	-116.26	-14.6	-29.5	32.9	15.7	17.22	1.912 CC, ES, SF		
5,000.0	5,000.0	4,998.0	4,998.0	8.7	8.7	-115.93	-14.8	-30.5	34.0	16.6	17.39	1.952		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Cathedral Energy Services

Anticollision Report

Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Reference Site: Lybrook
Site Error: 0.0ft
Reference Well: Lybrook P28-2306 02H
Well Error: 0.0ft
Reference Wellbore: HZ
Reference Design: Plan #2

Local Co-ordinate Reference: Well Lybrook P28-2306 02H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: USA EDM 5000 Multi Users DB
Offset TVD Reference: Offset Datum

Offset Design Lybrook - Lybrook P28-2306 01H - HZ - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-Geolink MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Total Uncertainty Axis	Separation Factor	Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)						
5,016.0	5,016.0	5,013.1	5,013.0	8.7	8.7	-115.59	-15.1	-31.5	35.1	17.6	17.45	2.012		
5,050.0	5,050.0	5,044.7	5,044.5	8.8	8.8	136.83	-16.0	-35.0	39.6	22.1	17.55	2.257		
5,100.0	5,099.7	5,089.4	5,088.4	8.9	8.9	140.98	-18.1	-42.7	52.3	34.7	17.65	2.966		
5,150.0	5,148.8	5,130.4	5,128.1	9.0	8.9	144.67	-20.8	-52.7	72.2	54.6	17.67	4.088		
5,200.0	5,196.9	5,167.0	5,162.8	9.1	9.0	146.97	-23.8	-63.9	98.7	81.1	17.61	5.604		
5,250.0	5,243.5	5,200.0	5,193.4	9.2	9.1	148.07	-27.0	-75.8	130.8	113.4	17.49	7.481		
5,300.0	5,288.5	5,225.1	5,216.1	9.3	9.2	147.69	-29.7	-86.0	167.7	150.4	17.33	9.676		
5,350.0	5,331.4	5,250.0	5,238.3	9.5	9.3	146.62	-32.7	-97.0	208.4	191.2	17.17	12.139		
5,400.0	5,371.9	5,263.6	5,250.1	9.8	9.3	143.29	-34.4	-103.4	252.0	234.9	17.11	14.730		
5,450.0	5,409.7	5,276.4	5,261.1	10.1	9.4	138.19	-36.1	-109.7	297.8	280.6	17.26	17.253		
5,500.0	5,444.5	5,285.5	5,268.9	10.4	9.4	129.52	-37.3	-114.4	345.3	327.4	17.90	19.294		
5,550.0	5,476.0	5,300.0	5,281.1	10.9	9.4	118.76	-39.4	-122.0	394.0	375.0	18.99	20.749		
5,600.0	5,504.0	5,300.0	5,281.1	11.4	9.4	94.88	-39.4	-122.0	443.0	422.3	20.73	21.368		
5,650.0	5,528.3	5,300.0	5,281.1	12.0	9.4	66.49	-39.4	-122.0	492.3	471.9	20.40	24.131		
5,700.0	5,548.7	5,300.0	5,281.1	12.8	9.4	44.75	-39.4	-122.0	541.5	523.3	18.13	29.860		
5,750.0	5,565.1	5,300.0	5,281.1	13.5	9.4	31.51	-39.4	-122.0	590.2	574.1	16.06	36.737		
5,793.7	5,575.9	5,284.2	5,267.8	14.3	9.4	21.35	-37.1	-113.7	631.8	617.5	14.24	44.375		
5,800.0	5,577.3	5,283.4	5,267.1	14.4	9.4	22.78	-37.0	-113.3	637.8	623.2	14.53	43.880		
5,850.0	5,587.6	5,277.8	5,262.3	15.3	9.4	32.66	-36.3	-110.4	685.0	668.0	16.94	40.428		
5,900.0	5,597.6	5,273.0	5,258.2	16.2	9.3	40.25	-35.6	-108.1	731.6	712.4	19.12	38.255		
5,950.0	5,607.1	5,269.0	5,254.8	17.1	9.3	45.95	-35.1	-106.1	777.4	756.5	20.92	37.157		
6,000.0	5,615.9	5,265.7	5,251.9	18.0	9.3	50.23	-34.7	-104.5	822.3	800.0	22.36	36.775		
6,050.0	5,624.2	5,250.0	5,238.3	18.8	9.3	51.83	-32.7	-97.0	866.4	843.2	23.12	37.466		
6,100.0	5,631.8	5,250.0	5,238.3	19.6	9.3	54.74	-32.7	-97.0	908.9	884.8	24.10	37.712		
6,150.0	5,638.6	5,250.0	5,238.3	20.4	9.3	56.98	-32.7	-97.0	950.0	925.2	24.82	38.273		
6,200.0	5,644.6	5,250.0	5,238.3	21.2	9.3	58.74	-32.7	-97.0	989.7	964.4	25.32	39.081		



Cathedral Energy Services

Anticollision Report

Company: EnCana Oil & Gas (USA) Inc
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Reference Site: Lybrook
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Reference Well: Lybrook P28-2306 02H
Well Error: 0.0ft
Reference Wellbore: HZ
Reference Design: Plan #2

Local Co-ordinate Reference: Well Lybrook P28-2306 02H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA EDM 5000 Multi Users DB
Offset TVD Reference: Offset Datum

Reference Depths are relative to WELL @ 7227.0ft (Aztec)

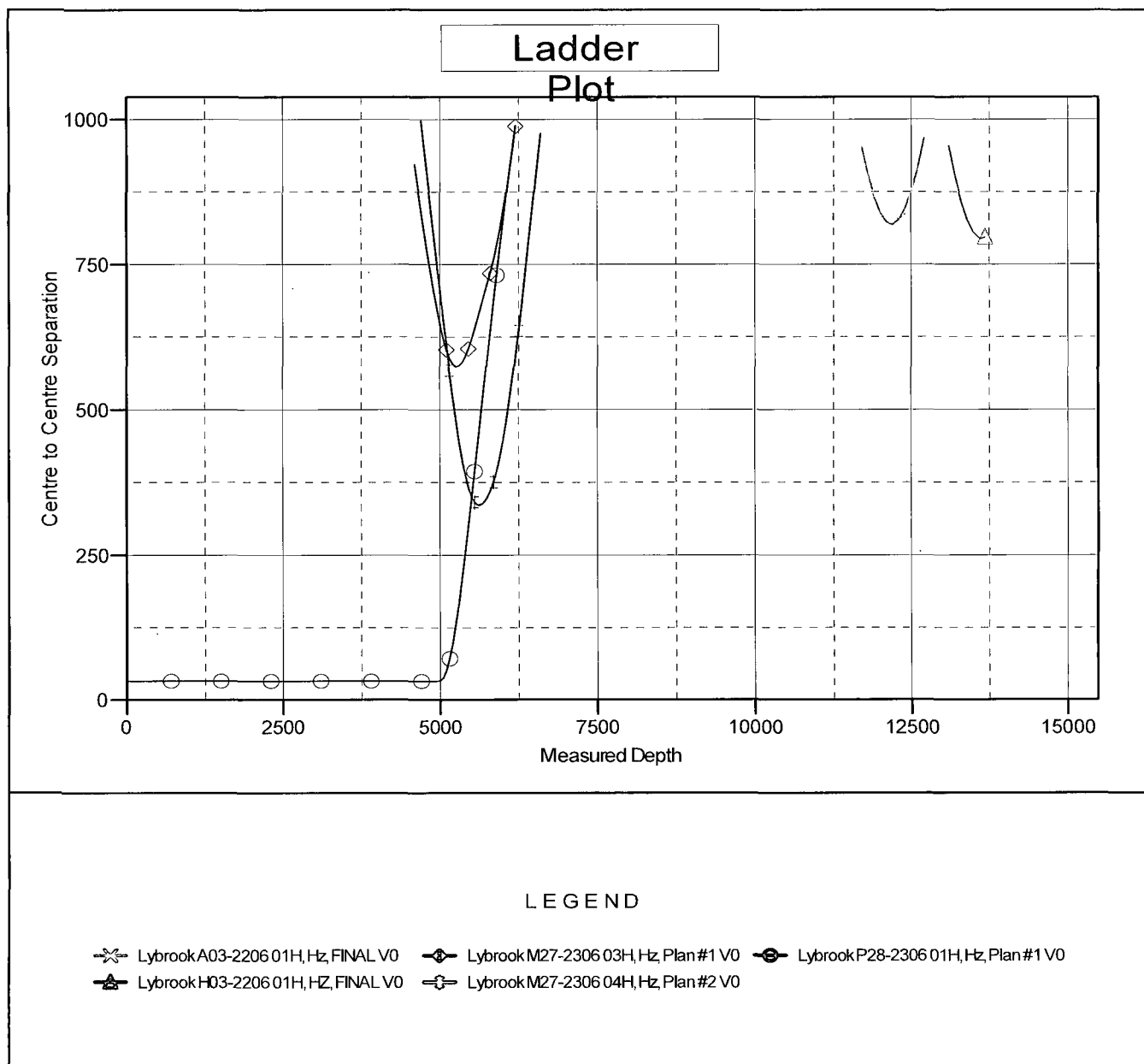
Offset Depths are relative to Offset Datum

Central Meridian is -106.250000 °

Coordinates are relative to: Lybrook P28-2306 02H

Coordinate System is US State Plane 1983, New Mexico Central Zone

Grid Convergence at Surface is: -0.72°



CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Lybrook P28-2306 02H

SHL: SESE Section 28, T23N, R6W

348 FSL and 1252 FEL

BHL: SENE Section 4, T22N, R6W

2330 FNL and 450 FEL

Sandoval County, New Mexico

Lease Number: NMNM 112953 & NMNM 109386

2. After removal of vegetation, topsoil will be segregated and windrowed on the edge of the. Topsoil will be defined as the top six (6) inches of soil. The stockpiled topsoil will be free of brush and tree limbs, trunks and root balls, but may include chipped or mulched material so long as it is incorporated into the topsoil stockpile.

Topsoil will be stockpiled separate from subsoil with a noticeable gap left between the stockpiles. Vehicle/equipment traffic will be prevented from crossing topsoil stockpiles.

Topsoil will not be stripped when soils are moisture-saturated or frozen below the stripping depth.

If the location becomes prone to wind or water erosion, Encana will take appropriate measures to prevent topsoil loss from wind. Such measures may include using tackifiers or water to wet the topsoil stockpile so that a crust is created across the exposed soil to prevent soil loss.

3. All construction materials for the well pad will consist of native borrow and subsoil accumulated during well pad construction. If additional fill or surfacing material is required, it will be obtained from existing permitted or private sources and will be hauled in by trucks over existing access roads.

The maximum cut will be approximately 11 feet on the northwest corner of the pad at corner 2 and the maximum fill will be approximately 15 feet on the northeast edge of pad at corner 3.

4. As determined during the onsite on July 31 2013, the following best management practices will be implemented:
 - a. The northeast corner (corner 3) of the well pad will be rounded.
 - b. Water will be diverted around the pad and silt traps installed as needed upon interim reclamation.
 - c. Pipeline will be at least 4'-5' below the drainage on the north side of the pad.
 - d. A tree screen will be maintained on the east side of the pad.
 - e. A fence will be installed on the south side of the pad to protect an arch site.
5. Construction equipment may include chain saws, a brush hog, scraper, maintainer, excavator, and dozer. Construction for the access road and well pad will take approximately 2 to 4 weeks.

C. Pipeline

See the Plan of Development submitted with the final Standard SF-299 Application for authorization to construct, operate, maintain and terminate a 2,592 foot, up to 6-inch buried, steel well connect pipeline that was submitted to the BLM concurrently with the APD.

✓ 7. METHODS FOR HANDLING WASTE

A. Cuttings

1. A closed-loop system will be used. Cuttings will be moved through a shaker system on the drill rig that separates drilling fluids from the cuttings. Cuttings will be stored onsite in above-ground storage tanks. Cuttings will be pulled from the storage tanks, mixed with saw dust or

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similar absorbent material, and disposed of at the Envirotech, Inc. and/or Industrial Ecosystem, Inc. waste disposal facilities.

2. The closed-loop system storage tanks will be adequately sized to ensure confinement of all fluids and will provide sufficient freeboard to prevent uncontrolled releases.
3. A 20-mil liner will be installed under tanks, pumps, ancillary facilities, and truck loading/unloading areas associated with the closed-loop system.

B. Drilling Fluids

1. A closed-loop system will be used. Drilling fluids will be stored onsite in above-ground storage tanks. Upon termination of drilling operations, the drilling fluids will be recycled and transferred to other permitted closed-loop systems or returned to the vendor for reuse, as practical. Residual fluids will be vacuumed from the storage tanks and disposed of at Basin Disposal, Inc. and/or Industrial Ecosystem, Inc. waste disposal facilities.
2. The closed-loop system storage tanks will be adequately sized to ensure confinement of all fluids and will provide sufficient freeboard to prevent uncontrolled releases.
3. The closed-loop system storage tanks will be placed in bermed secondary containment sized to accommodate a minimum of 110 percent of the volume of the largest storage tank.
4. A 20-mil liner will be installed under tanks, pumps, ancillary facilities, and truck loading/unloading areas associated with the closed-loop system.

C. Flowback Water

1. The water-based solution that flows back to the surface during and after completion operations will be placed in storage tanks on the location.
2. Flowback water will be confined to a storage tank for a period not to exceed 90 days after initial production and will be disposed of at Basin Disposal, Inc. and/or Industrial Ecosystem, Inc. waste disposal facilities.

D. Spills – any spills of non-freshwater fluids will be immediately cleaned up and removed to an approved disposal site.

E. Sewage – self-contained, chemical toilets will be provided for human waste disposal. The toilet holding tanks will be pumped, as needed, and the contents thereof disposed of in an approved sewage disposal facility. The toilets will be onsite during all operations.

F. Garbage and other waste material – garbage, trash and other waste materials will be collected in a portable, self-contained and fully-enclosed trash container during drilling and completion operations. The accumulated trash will be removed, as needed, and will be disposed of at an authorized sanitary landfill. No trash will be buried or burned on location.

G. Immediately after removal of the drilling rig, all debris and other waste materials not contained in the trash container will be cleaned up and removed from the well location.

H. No chemicals subject to reporting under SARA Title III in an amount equal to or greater than 10,000 pounds will be used, produced, stored, transported, or disposed of annually in association with the drilling, testing or completing of this well.

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- I. No extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities, will be used, produced, stored, transported, or disposed of in association with the drilling, testing, or completing of this well.

8. ANCILLARY FACILITIES

- A. Standard drilling operation equipment that will be on location includes: drilling rig with associated equipment, temporary office trailers equipped with sleeping quarters for essential company personnel, toilet facilities, and trash containers.

9. WELL SITE LAYOUT

- A. The proposed well pad layout is shown on Sheets F-1, F-2, G-1, and G-2. Cross sections have been drafted to visualize the planned cuts and fills across the location. Refer to Item 6 for construction materials and methods.
- B. No permanent living facilities are planned. Office trailers equipped with living quarters will be provided on location during drilling and completions operations.
- C. The production facility layout is being deferred until the Facility and Reclamation onsite with the BLM Representative. Production

10. PLANS FOR SURFACE RECLAMATION

The project falls within the Pinyon-Juniper Vegetation Community. During the onsite on July 31, 2013, plant species were picked from the Pinyon-Juniper Community Seed List. These species will be used in the revegetation seed mixture. Please see Reclamation Plan (Appendix A).

The well pad, road and pipeline will fall under the BLM Vegetation Reclamation Procedure B. A site-specific Reclamation Plan is located in Appendix A. The BLM will be contacted 48 hours prior to construction and reclamation.

11. SURFACE OWNERSHIP

Bureau of Land Management

12. OTHER INFORMATION

- A. A Standard Form SF-299 Application for authorization to construct, operate, maintain and terminate a 30-foot overall right-of-way access road with a 14-foot road running surface was submitted to the Bureau of Land Management on June 26, 2013. A Surface Use Plan of Operation was submitted to the Bureau of Land Management concurrently with the APD reflecting a 2,324' access road. Issued Serial Number NMNM 130749.
- B. Well Pad is on-lease, no Right-of-Way required.
- C. A final Standard Form 299 Application and Plan of Development for authorization to construct, operate, maintain and terminate a 2,592 foot, up to 6-inch buried, steel well connect pipeline was submitted to the Bureau of Land Management concurrently with the APD. Issued Serial Number NMNM 130750.
- D. A Class III Cultural Resource Inventory of the proposed well pad, access road, and pipeline route will be conducted and filed with the BLM-Farmington Field Office.
- E. Construction contractors will call New Mexico One-Call (or equivalent) to identify the location of any marked or unmarked pipelines or cables located in proximity to the proposed well pad, access road, and pipeline at least two working days prior to ground disturbance.

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- F. All operations will be conducted in such a manner that full compliance is made with the applicable laws and regulations, the approved Application for Permit to Drill, and applicable Notice(s) to Lessees.
- G. Encana will be fully responsible for the actions of its subcontractors. A complete copy of the approved Application for Permit to Drill will be furnished to the field representatives and will be on location during all construction, drilling, and completions operations.

WELLHEAD BLOWOUT CONTROL SYSTEM

encana

Well name and number:

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